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# COMPOSITAE



# NEWSLETTER

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## EDITORIAL

It is a great pleasure to announce that Mr. Sven Koeltz of Otto Koeltz Antiquariat has agreed to cover all duplicating and mailing costs of the COMPOSITAE NEWSLETTER beginning with this issue. This is a welcome financial contribution as it obviates the solicitation of funds from readers in the near future. My own business dealings with Otto Koeltz Antiquariat over the past years have been excellent, and I encourage the readers of the NEWSLETTER to take advantage of their new, used, and reprint botanical offerings. The Department of Botany of The Ohio State University is still providing secretarial assistance for preparing the typescript, and this continuing contribution also is very much appreciated.

Discussion has occurred recently in several laboratories here in the United States on the precise meaning of morphological terms commonly used in systematic studies of Compositae, such as palea, throat, limb, squamella, etc. John Strother (Univ. California, Berkeley) and Harold Robinson (Smithsonian Institution, Washington, D.C.) have agreed to prepare a Glossary of Terms Used in Synantherology provided other workers believe such a project would be useful. My personal view is that this would be very helpful. For convenience in responding to their ideas, the last page of the NEWSLETTER is a tear-off form that may be used to reply. I hope you will take the opportunity to share your opinions with them.

## ARTICLES

PHILOSOPHY OF SMALL CONTACT DERMATITIS FROM LICHENS, LIVERWORTS,  
COMPOSITAE SPECIES AND SESQUITERPENE LACTONES

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During the past ten years we have enjoyed an inter-disciplinary and social intercourse which has given much pleasure and interesting work to various botanists, phytochemists and dermatologists. As a result of work supplemented by home dinner discussions, we have published a lot -- some 64 papers in the past three years. I have been asked to write a report for the NEWSLETTER and will take an historical approach. An historical approach may not become apparent from published work where it is often necessary to reverse the order of the thinking-- nor from grant applications where it is sometimes necessary to apply to do work for which one already knows the answer in order to break new ground.

Historically, I phoned up a curious character in Botany to say that I had a patient who was skin contact allergic to lichens. I asked him, naively I suppose, to redirect his research effort to this obviously important field. He replied, somewhat obscurely I thought, that money was required for such work. So we eventually got some. This curious character turned out to be Neil Towers (I use the word curious in the Joseph Banks and 18th Century sense of a man interested in the natural arts and sciences, then hardly rigidly distinguished). He suggested that d-usnic acid might be an allergen of lichens, not L-usnic acid. So it turned out to be, a fascinating example of stereoisomeric immunological specificity in allergic contact dermatitis (Mitchell, 1966). It also turned out that the French knew about allergy to lichens before we did (Dr. LeCoulant, Dr. Foussereau, Professor Ourisson and their co-workers), but not, it seems, about d- and L-usnic acid.

We turned to "cedar-poisoning", a mysterious skin disease of British Columbia forest workers who had dermatitis from exposure to vegetation. The disorder was not then accepted as a compensable entity by the Workers' Compensation Board. It was economically crippling to many workers who were disabled by recurrent dermatitis at work. The blame for the dermatitis was unjustly laid to yellow cedar (Thuja). We found, during five years, 75 such workers who were contact allergic to a liverwort, Frullania, which grows on cedar and other trees. Liverworts and lichens were the cause of so-called "cedar-poisoning". The French workers beat us to it here too - they knew about the allergy to Frullania and identified an allergenic sesquiterpene lactone (Knoche et al 1969).

But one of our forest workers who was contact allergic to Frullania retired from forest work and took up the hobby of growing chrysanthemums. He found that he was contact allergic to Chrysanthemum. With the aid of his sons, we dug up and discarded all his Chrysanthemum cultivars, but he did not get better - his severe dermatitis continued unabated. I visited his home (we still do house calls here) and found that as he sadly contemplated his empty Chrysanthemum beds, he was pulling up a weed which was rampant in the beds, namely tansy (Tanacetum vulgare). What had that to do with it? A weedy tansy hardly looks to an uneducated eye like a Chrysanthemum in full flower in our garden shows. I phoned up my curious colleague who told me that Tanacetum was botanically and phytochemically related to Chrysanthemum and both yielded sesquiterpene lactones. This patient was then found to be contact allergic to lactones of many Compositae species. He recovered from dermatitis which had persisted for 50 years following some simple advice on gardening habits

and avoidance of related plant allergens. It is said that an inter-disciplinary approach to medical problems is often surprisingly rewarding. This was certainly the case for this patient who had a severe and prolonged skin disease.

Then I learned that whatever phytochemists told me during our weekly dinner meetings could be written down the next day and published. This was not far from the truth; many phytochemical and botanical ideas found instant favourable reception from our dermatological journals. After all, Botany and Medicine have a very long association, only recently separated. The jargon of nomenclature is a problem--when are we to have a Linnaeus for biochemical nomenclature? At the present time naming of compounds is almost more incomprehensible than the naming of skin diseases. Can you beat Pityriasis lichenoides varioliformis (Mucha-Haberman)? What beast of the field is a synantherologist?

It is still amazing that workers in different parts of the world can independently but concomitantly think up a significant new idea or arrive at relevant synthesis of older ideas.

For example, we now know that patients who have dermatitis from the liverwort (Frullania) are also contact allergic to Costus and Champaca oils of perfumery (Saussurea, Compositae; Michelia, Magnoliaceae), to commercial white wood (Liriodendron, Magnoliaceae), to ragweed (Ambrosia, Compositae), to Chrysanthemum, Artemisia (Bitterweed), chichory (Cichorium), lettuce (Lactuca) and to numerous composite plants to which they may never have been exposed, such as Parthenium hysterophorus. The cross-sensitivity results from a common content of sesquiterpene lactones in the plants.

Parthenium hysterophorus is currently causing an explosive outbreak of "weed" dermatitis in India. Thousands of patients have developed severe contact dermatitis from contact with this plant recently introduced into India (Lonkar et al. 1974). The allergen is a sesquiterpene lactone. Interest in this epidemic has led to the formation of a Parthenium Research Group (see paper of Rodriguez et al. in this issue).

Some patients who have Compositae weed dermatitis appear to be reactive to light, that is, photosensitive. Thiophenes derived from Compositae are phototoxic in microbial systems. We do not yet know the role of thiophenes in Parthenium dermatitis. (Camm et al. 1975).

Quite likely, further cooperative work may produce useful results for patients who have disabling skin diseases. Thank you for the opportunity to contribute to the Compositae Newsletter.

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#### ALLERGIC CONTACT DERMATITIS AND SESQUITERPENE LACTONES

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Synantherologists suffering from sleepless nights brought on by constant itching and redness of the skin may find that their present dilemma is caused by a certain class of chemical constituents present in their favourite family - the Compositae. Our recent clinical experience at the University of British Columbia has established that a plethora of sesquiterpene lactones (isoprenoid derivatives present in taxa of all tribes of the Compositae with the exception of the Tageteae) are the major haptens involved in the formation of skin antigens (protein-hapten complex) that elicit delayed hypersensitivity reactions in man.

In this brief account we summarize the distribution of some sesquiterpene lactones known to cause allergic dermatitis, elaborate on the proposed mechanism of action of lactones and conclude with some comments on the objective(s) of an international group composed of dermatologists, phytochemists, taxonomists and immunochemists that are trying to find solutions to the control of aggressive weeds that cause dermatitis and treatment of people suffering from contact allergy.

#### Allergic contact dermatitis (poison-ivy or weed dermatitis)

Most people are familiar with allergies brought about by proteins (allergens) present in the pollen of Compositae species (e.g., hayfever from Ambrosia spp.). Dermatitis resulting from exposure to small molecular weight constituents of higher plants is more widespread than